

18

BARRIERS TO COOPERATIVE GOVERNANCE IN  
THE CONSTRUCTION INDUSTRY

by

David Willett

Bachelor of Architecture  
University of Cincinnati, 1989

Submitted to the Department of Civil and Environmental  
Engineering in Partial Fulfillment of the Requirements for  
the Degree of

MASTER OF SCIENCE

at the

Massachusetts Institute of Technology

February 1995

© 1995 Massachusetts Institute of Technology  
All rights reserved

Signature of Author .....

Department of Civil and Environmental Engineering  
January 19, 1995

Certified by .....

Dr. Henry Irwig  
Thesis Supervisor

Accepted by .....

Joseph M. Sussman  
Chairman, Departmental Committee on Graduate Studies  
Barker Eng

# BARRIERS TO COOPERATIVE GOVERNANCE IN THE CONSTRUCTION INDUSTRY

by

DAVID WILLETT

Submitted to the Department of Civil and Environmental  
Engineering on January 19, 1995 in Partial Fulfillment of the  
Requirements for the Degree of Master of Science

## ABSTRACT

The design and construction of a building is a coordination intensive process. The more effectively actors can coordinate with one another, the more efficiently they can deliver a building. Given the current state of the construction industry, how can coordination be improved, so that buildings can be delivered more efficiently?

Coordination is facilitated by the mechanisms and governance used by an organization. Currently, the mechanisms used by project organizations in the construction industry seem to be hindered by market governance. In order to understand the full impact that market governance has on coordination mechanisms, a case study was performed of an organization that uses cooperative governance, the Watch Tower Bible and Tract Society of Pennsylvania. The case study uncovered a number of mechanisms which facilitate coordination when used with cooperative governance. The use of these mechanisms, however, is hindered if not prohibited when used with market governance. Goal incongruence, stereotypes, and status hierarchies created by market governance act as barriers to the use of many coordination mechanisms which could be used during the delivery of buildings. In addition, they also act as barriers to cooperative governance itself.

There are a number of ways to address the barriers to cooperation created by competition, so that coordination can be improved through the use of certain mechanisms. Goal congruence can be achieved by changing the focus of goals, contracting methods, actor selection methods, and project duration. Stereotypes can be eliminated by making goals and strategies public knowledge, selecting all actors at the outset of a project, promoting generalist knowledge, and eliminating these stereotypes from the process of educating actors. Status hierarchies can be removed by making supervision something that happens in addition to performing other activities, not limiting the number of actors performing supervision, build consensus in the selection of supervisors, and not compensating supervisors any differently. If these things are done and actors are given the skills they need to coordinate, buildings could be delivered more efficiently.

Thesis Supervisor: Dr. Henry Irwig  
Title: Senior Lecturer

## **Acknowledgments**

Dr. Henry Irwig  
David Hussey  
CCRE

Andrea Willett  
Chris Hussey  
Sheila Hussey

& Mina

# **Table of Contents**

Title Page.....	1
Abstract.....	2
Acknowledgments .....	3
Table of Contents.....	4
Chapter One: Introduction .....	5
1.1 Overview of the Construction Industry.....	5
1.2 Thesis Goal .....	7
1.3 Methodology .....	7
Chapter Two: Coordination .....	8
2.1 Types of Mechanisms .....	10
Vertical .....	10
Lateral .....	12
2.2 Types of Governance .....	15
Bureaucracy .....	15
Market.....	15
Cooperative.....	16
2.3 Balance of Competition and Cooperation .....	16
Chapter Three: Case Study of the Watch Tower Society .....	19
3.1 Brief History .....	19
3.2 Construction.....	20
3.3 Governance .....	22
3.4 Coordination Mechanisms .....	25
Chapter Four: Analysis .....	35
4.1 Role of Governance .....	35
4.2 Applicability of Mechanisms.....	37
Chapter Five: Barriers to Cooperative Governance.....	44
5.1 Goal Incongruence.....	44
5.2 Stereotypes.....	46
5.3 Status Hierarchies .....	48
5.4 Coordination Skills .....	49
Chapter Six: Conclusions.....	51
6.1 Topics For Future Research .....	53
References.....	54

## **Chapter One: Introduction**

The delivery of a building is the process by which a building is designed and constructed. The process of design and construction are broken down into many activities, each being performed by specially trained actors. Actors involved in the delivery of a building range from owners, architects, engineers, and construction managers to general contractors, trades people, manufacturers, and inspectors. Due to the large number of activities to be performed and the many actors needed to perform them, the process of designing and constructing a building are coordination intensive. The effectiveness of any one actor depends not only on their ability to perform an activity, but also on their ability to coordinate with actors performing other activities. The more effectively actors can coordinate their activities, the more efficient the delivery of a building.

The amount of coordination that is required for the efficient delivery of a building is dependent on the building itself, the coordination mechanisms and governance used by the organization(s) delivering the building. There are various coordination mechanisms that, when used with the appropriate governance structure, can be very effective depending on the amount of coordination required by the building. But as buildings require more and more coordination, the same mechanisms and governance become less effective. This seems to be the case in the construction industry. When the construction industry is compared with other manufacturing-oriented industries, it does not take long to realize that there is a lot of room for improvement. In attempts to become more productive, many construction organizations have adapted the mechanisms and governance that are so successful in the manufacturing industry but, soon find out that construction and manufacturing are two very different industries. In order to deliver buildings more efficiently in the construction industry, organizations must either change the buildings being delivered, the coordination mechanisms, and/or the governance being used.

### **1.1 OVERVIEW OF THE CONSTRUCTION INDUSTRY**

It has become increasingly difficult for design firms and construction companies to remain profitable in the construction industry. There are a number of reasons for this. First, it is very difficult to create customers in the construction industry because it is a service industry and there is no physical product to sell. With the exception of pre manufactured buildings, like houses or warehouses, most buildings are specifically designed and built to suit an owners needs and goals. An owner is sold on the services

that can provide a building, not the building itself. What this means is that the owners typically cannot see what they are buying until after a significant amount of capital has been tied up. For some owners, this may be during the design phase and others, only after the building has been completed. To minimize risk, most owners prefer to commit only to design services until they feel comfortable with the product they are getting, only then, does an owner commit to the construction of it. It is very difficult to deliver a building efficiently when the design of the process of construction happens in isolation from the design of the product, the building. Second, the construction industry is fragmented both vertically and horizontally. Vertical fragmentation refers to the many phases of a project and horizontal refers to the many specialists for each phase [Howard 89] Third, competition is fierce between design firms because of the oversupply of designers performing similar services. The same is true with construction companies. Because of this competition, firms and companies must improve their services and reduce costs in order to get work. There are even cases where firms and companies give away services in order to secure work. Architectural competitions are a good example of this. Fourth, due to the reduced profit margins, there is very little, if any, capital for research and development leading to innovations which can differentiate one firm or company from another. Architects try to develop a style which differentiates themselves from other architects, but there are very few which can rely on it for work. As for innovative building systems and methods of construction, these are introduced by manufacturers and suppliers, not contractors. As designers and contractors try to serve the customer better to get work, their services become more and more similar. In economics, this is referred to as "perfect competition" [Fisher 94]. "Perfect competition" is described as "a hypothetical state in which goods and services in a market are abundant in quantity, identical in quality, and attainable at absolutely the lowest price possible" [Fisher 94]. "Perfect Competition" is usually the result of having low entry barriers, buyer bargaining power, numerous substitute services, and intense rivalry between existing competitors. [Fisher 94] Fifth, reduced profit margins also leads to competition between the design firms and contracting companies during the delivery of a building. As the profit margins decrease, the need for contract administration increases. Sixth and lastly, the costs of running a business have increased, raising overhead. The rising costs of professional liability, general liability, workman's comprehensive, and medical insurance make it more and more difficult for small firms and companies to retain employees upon the completion of a project. [Gutman 89][Howard 89]

Much of the horizontal and vertical fragmentation in the construction industry is a result of the open bidding policies required on all public work. While this is apparent to

many people, it is not likely to change due to the long history of and values of U.S. Institutions [Howard 89]. So, until an owner's risk can be reduced, the demand for buildings increases and becomes less cyclical, and/or the number of designers and contractors decreases, design firms and construction companies are going to have to continue to find ways to become more efficient at performing and coordinating activities in order to survive.

## **1.2 THESIS GOAL**

The goal of the research embodied by this thesis is to determine how coordination can be improved in the construction industry so that buildings can be delivered more efficiently.

## **1.3 METHODOLOGY**

It is important to give a little background on Coordination, the types of mechanisms which are currently used to facilitate coordination, and the effects that governance has on coordination prior to presenting and analyzing the case study. This background information can be found in chapter 2. The amount of coordination that is required for the efficient delivery of a building is dependent on the building's complexity, uncertainty surrounding the activities, number of activities and actors, diversity of outputs, goal difficulty, goal diversity, coordination mechanism, governance, selection of actors, and the balance between competition and cooperation. Chapter 3 contains the case study of the Watch Tower Bible and Tract Society of Pennsylvania concentrating on the governance and coordination mechanisms used. This particular organization was chosen on four counts: first, the organization is based on cooperation; second, it exists within an environment of fierce competition; third, the organization remains stable even in the face of continued global expansion, and fourth, the organization performs a majority of its own construction. The benefit of doing the case study is to uncover the mechanisms that are used by the Watch Tower Society to increase the effectiveness of coordination and, also, to find out what barriers exist within the construction industry which prevent their use. Chapter 4 contains a comparison of governance between the Watch Tower Society and the construction industry along with the coordination mechanisms uncovered by the case study and their applicability to the construction industry. Chapter 5 outlines the barriers to the use of the coordination mechanisms uncovered by the case study and what can be done to overcome these barriers. In chapter 6, conclusions are drawn as to how coordination in the construction industry can be facilitated in order to deliver buildings more efficiently.

## **Chapter Two: COORDINATION**

*Coordination* is "the act of working together" and *work* is the "physical or mental effort or activity directed toward the production or accomplishment of something" [Stein 1971]. Therefore, coordination is the act of working together to perform activities which lead to something being accomplished. Thomas Malone, in his theory of Coordination, breaks coordination down into what he calls its four components: goals, activities, actors, and interdependencies [Malone 91]. Goals are what is trying to be accomplished. Activities are what has to be done in order to accomplish the goals. Actor(s) refer to the person(s) or organization(s) that perform each of the activities. Lastly, interdependencies are the relationships between activities and actors. Coordination is another term for what J. Galbraith referred to as "information processing" in his book, *Designing Complex Organizations*. The more information that must be processed between actors, the more coordination.

The amount of coordination that must take place is dependent on a number of things. The need for coordination increases in the construction industry as buildings become more complex. A project of relatively low complexity requires less coordination prior to and during the process of design and construction than a project of higher complexity. A project's complexity can come as a result of the design, means and methods of construction, the construction schedule, the budget, site conditions, regulatory procedures, labor agreements, or any number of other sources. Generally, the more complex a project is the more activities there are which require coordination prior to being executed.

Coordination also increases as the uncertainty surrounding a project or an activity increases. Galbraith points out that the amount of coordination that takes place between actors increases proportionally with the uncertainty of the activity. He defines *uncertainty* as "the difference between the amount of information required to perform the task (activity) and the amount of information already possessed by the organization (actor)"<sup>1</sup> [Galbraith 73]. Uncertain activities cannot be pre-planned which means coordination must happen during activity execution when resources are tied up and are less flexible [Galbraith 73]. Activities that cannot be pre-planned require more coordination than activities that can.

Uncertainty within a building project can be reduced by breaking uncertain

---

<sup>1</sup> The terms within parentheses have been added to maintain consistency with the terminology of the thesis.



activities down into sub activities and assigning them to actors most qualified to perform them. This can continue until there is no actor that is more capable to perform an activity or a sub activity of one. This is the case in the construction industry, where the process of designing and constructing a building is very fragmented being broken down into many separate activities which are performed by many different actors. This reduces uncertainty, but the amount of coordination required increases for two reasons. First, there are many more actors which must be coordinated. Second, the activities which each actor performs have a diversity of outputs [Galbraith 73]. What this means is that the output from one actor is very different from that of another actor. A few examples are the drawings created by an architect, the foundation formed by a concrete subcontractor, the rough framing built by the carpenters, and the lighting installed by the electrician. Each one of these outputs are performed differently and require different behavior which makes coordination more difficult between actors, thus increasing the amount of coordination.

Coordination increases as goals become more difficult to achieve [Galbraith 73]. Projects which set goals that are relatively easy to accomplish require less coordination than projects which set goals which are more difficult to accomplish. Goals which are performance driven are good examples, like goals which have to do with quality, timeliness or cost. Projects that do not require a high degree of quality or have no time restraints require less coordination than projects which do.

Coordination is critical to the efficient delivery of a building, but there comes a point when actors spend more time coordinating than they do performing their activity(ies) which actually decreases efficiency. In these instances, there are two different strategies which can be used to deal with coordination overload. The first is to reduce the amount of coordination that an actor must perform. One way to accomplish this would be to reduce the complexity, uncertainty, number of activities and actors, diversity of outputs, and performance goals of a project. Another is to use mechanisms which can facilitate coordination. There are mechanisms which can be used to decrease the amount of coordination an actor must perform without affecting the process of design or construction. The second strategy is to increase an actor's ability to coordinate. Both of these strategies are valid depending on the circumstances surrounding a project. The important thing to remember when reviewing these mechanism in the next section, is the balance that must be maintained between the amount of time an actor spends coordinating and performing their activity(ies). If the correct balance can be maintained, then a building can be delivered more efficiently.

The amount of coordination that is required for the efficient delivery of a building is dependent on the coordination mechanism, governance, and the balance between competition and cooperation within a project organization.

## **2.1 TYPES OF MECHANISMS**

There are limits to the number of activities any one actor can perform and the number of actors any one actor can coordinate with. There comes a point, which varies from actor to actor, when actors simply cannot effectively coordinate without some sort of mechanism to aide them. There are three mechanisms which can be used to decrease the amount of coordination an actor has to perform. These are referred to as vertical coordination mechanisms. These mechanisms are mutual adjustment, direct supervision, and standardization [Mintzberg 79]. There are three types of lateral coordination mechanisms and they, like the vertical coordination mechanisms, range from simple to more complex. They are informal or voluntary mechanisms, formal groups, and integrators. The time and difficulty required to manage these mechanisms varies with complexity, therefore, the informal or voluntary mechanism takes the least amount of time and are least expensive. The integrators, on the other hand, takes the most time to manage and are the most expensive. The type of lateral coordination mechanism should be matched to the amount of coordination that takes place, so that benefits outweigh the cost of the mechanism.[Galbraith 94] Each of the vertical mechanisms are not mutually exclusive of each other or of the lateral mechanisms. They can and usually are used simultaneously throughout a project organization. They do, however, vary in how difficult they are to implement, the easiest ones being used in the beginning and the more complex ones being used when the simple ones are no longer effective. The key is recognizing when they are no longer effective.

### **2.1.1 VERTICAL COORDINATION MECHANISMS**

Vertical coordination mechanisms are used to centralize decision making within an organization and result in hierarchical structures within an organization [Galbraith 94].

#### **2.1.1.1 MUTUAL ADJUSTMENT**

Mutual adjustment is the simplest of the coordination mechanisms. Two actors use informal communication to coordinate their respective activities which they have total control over. Coordination happens only when instigated by one of the actors. There is a point where the effectiveness of mutual adjustment declines because there are

simply too many actors and too much time is spent on coordination. When mutual adjustment is no longer effective as an organization's coordination mechanism, direct supervision is also used.

### 2.1.1.2 DIRECT SUPERVISION

Direct supervision reduces the amount of coordination that each actor must perform in order to complete their respective activities by adding another actor whose sole activity is to coordinate the work of the other actors. This sets up a parent-child relationship. Direct supervision as a coordination mechanism can be overloaded when coordinating the work of many actors with simple tasks or the work of a few actors with very complex tasks. As direct supervision becomes ineffective, standardization should be used.

### 2.1.1.3 STANDARDS

Standards are developed when the supervising actor can no longer effectively coordinate the work of those actors he or she is supervising. There are three different types of standardization, standardization of products, processes, and skills. Examples of each are pre manufactured housing units, safety procedures, and the building trades, respectively. Standards reduce the amount of information that must be processed by the supervising actor while also allowing the actors to complete their activities more effectively. Only exception cases, which are not covered by the standards, need to be processed by the supervising actor.

The three vertical coordination mechanisms can be placed in a rough continuum based on the amount of coordination required. [Mintzberg 79]

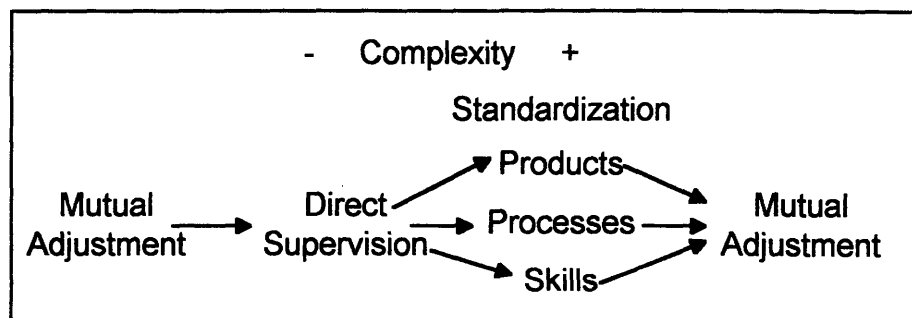


figure 1. Mintzberg's Rough Continuum of Complexity

Once an organization has reached a level of complexity where none of these coordination mechanisms are effective, Mintzberg suggests, as shown in figure 1, that the organization will revert back to mutual adjustment. This is also true during periods of crisis. The problem with vertical coordination mechanisms is, while they decrease the amount of coordination that actors must perform, they also decrease an actor's ability to coordinate their own activity(ies). This is critical for uncertain activities because they must be coordinated while they are being executed when timing is critical. The mechanisms are effective in that they allow an actor to concentrate on performing their activity, but efficiency is lost because they end up having to wait for their activities to be coordinated by someone else. This problem can be addressed by using the mechanisms which increase an actors ability to coordinate, lateral coordination mechanisms.

### **2.1.2 LATERAL COORDINATION MECHANISMS**

Lateral coordination mechanisms are also referred to as bypass channels of communication [Mintzberg 79], because they allow actors to bypass the hierarchies created by the vertical coordination mechanisms. The effect of the lateral mechanisms is to decentralize decision making [Galbraith 94].

#### **2.1.2.1 INFORMAL**

Informal or Voluntary lateral coordination mechanisms are the simplest and easiest to use. This type of lateral coordination is the same as mutual adjustment, except it happens independently from the vertical coordination mechanism. Informal lateral coordination happens between two or more actors, usually without upper management's being involved, and allows an actor to complete their activities quicker than waiting for the information to pass up one side of the hierarchy and down the other side where the information resides. It happens from the bottom up. Henry Mintzberg makes mention of three different kinds of what he calls informal communications. They are direct peer contact, direct diagonal contact, and an override of the scalar chain [Mintzberg 79]. I have added another, the intra-organizational direct contact, which is informal coordination across organizational boundaries. Direct peer contact is when two actors by-pass the formal authority of their shared parent actor, or boss. This is the informality of mutual adjustment replacing the formality of direct supervision. Direct diagonal contact is when an actor communicates directly with a subordinate of a peer. Again, the vertical coordination mechanism is sidestepped by mutual adjustment. An override of the scalar chain is when two actors use mutual adjustment and by-pass a manager in the process. The last generic type which I added to Mintzberg's, is the intra-organizational

direct contact. This is when one actor in one company communicates with another actor at a separate company, regardless of status. The type of communication can be any of the three previously mentioned. The informal lateral coordination mechanism can be used as much or as little as needed, but there are limits to its effectiveness. While it is difficult for top management to control an actor's use of informal lateral coordination mechanisms, there are a number of different ways to facilitate their use. They are Interdepartmental Rotation, Physical Rotation, Information Technology Networks, Interdepartmental Events, and Mirror-Image Organizational Structures. Each will be reviewed briefly for each of their benefits and costs.

#### **2.1.2.1.1 INTERDEPARTMENTAL ROTATION**

Actors that are rotated gain knowledge and perspective that can facilitate lateral coordination. They also build a larger network of other actors which they can communicate with in the future. The cost of rotation is high because the actors who rotate are less productive when they enter a department and leave for another when they do become productive. Also, actors who are rotated cannot maintain specialist skills. It is also may be expensive to relocate actors.

#### **2.1.2.1.2 PHYSICAL LOCATION**

It is much easier to informally coordinate if in the same proximity of other actors. For example, if eating dinner at a long rectangular table, it is easier to talk to the person across and to either side of you than it is to talk to the person at the head of the table. If eating dinner at a large circular table, it is easier to talk to the person on either side of you as opposed to the person across from you. The cost is that there is a limit to the amount of actors that can be co-located. Generally, communication between certain actors is increased but with other actors that are not co-located, it is decreased.

#### **2.1.2.1.3 INFORMATION TECHNOLOGY NETWORKS**

Given the decreased costs and widespread diffusion of information technology, any actor within the organization can communicate with any other actor at their own discretion. In effect, everyone is colocated. Informal networks are built through the use of E-mail, shared databases, and groupware. The costs of hardware and software is decreasing, but it makes little sense to give it to only a few actors. It is only advantageous if there is widespread diffusion and this can be expensive. There is also the need for an actor whose sole activity is to manage the system.

#### **2.1.2.1.4 INTERDEPARTMENTAL EVENTS**

Events can be anything that brings actors together like a training seminar, quarterly meetings, company softball, or a company picnic. There are two benefits to events like these. First, is the reason for the event whether it be to train employees or to play softball. The second is the network of actors that are created through such events. The costs to attend the event along with the time that the actor would not be performing any productive activities varies depending on the duration of the event and type of event.

#### **2.1.2.1.5 MIRROR-IMAGE DEPARTMENTS**

Mirror image departments decreases the amount of interdependencies between tasks by assigning an actor from each functional department, i.e. engineer, architect, sales representative, estimator, etc., to each team. Communication happens faster but there are costs. The costs are that the actors may not be able to maintain specialization skills and there is redundancy between the different departments.

#### **2.1.2.2 FORMAL GROUPS**

Formal Groups are the second type of lateral coordination mechanism. Formal groups are created by upper management to serve a particular purpose and to assign accountability for the purpose. The actors that are chosen to make up a formal group are generally from as many different departments as needed to ensure that decisions can be made quickly and accurately. Generally, the actors that make up the formal group are those that will be performing the activities because they are the closest to where the pertinent information resides. If the formal group is put together for a manufacturing issue, then the shop floor actors will be present. If the formal team is put together for an organizational issue, then it will be made up of managers. The duration of a team may be to solve one problem or they may be more permanent depending on the organization's need. These formal groups are often referred to as a team, task force, committee, board, or council. They are different from informal coordination in that they happen top down instead of bottom up. Formal groups are more time consuming and more difficult to manage than informal lateral coordination. Because they are more difficult, they typically do not form on their own like voluntary groups.

#### **2.1.2.3 INTEGRATORS**

Integrators are the last and most complex type of lateral coordination mechanism. An integrator can be an actor, also referred to as a liaison, or an agent, whose sole activity is to facilitate lateral coordination within an organization. The actors are

generally good leaders with strong leadership and management skills. While they are not experts in any one department, they do have a good understanding of all aspects of an organization and can resolve conflicts judiciously.

## **2.2 TYPES OF GOVERNANCE**

Governance is defined as "the act, process, or power of governing". [DeVenne 82] To govern is "to control the actions or behavior of". [DeVenne 82] The governance structure of an organization specifies the degree to which "actions" and "behaviors" must be controlled. There are three different types of governance: bureaucratic, market, and cooperative governance. Bureaucratic governance provides the highest degree of control while cooperative governance provides the least amount of control.

### **2.2.1 BUREAUCRACY**

The bureaucracy is a governance structure which is based on a command economy [Mollner 92] The selection of actors to make up a bureaucracy is based on competition. Actors compete with one another for a limited number of positions in the organization. The ones that can best perform the activity(ies) required at a reasonable cost are usually selected. Once selected, an employment contract is used which compensates an actor for placing the goals of the organization ahead of their own personal goals. Employees also have professional goals which places them in competition with fellow workers for a limited number of upper level positions. Due to the fact that only a limited number of workers can be promoted and those promoted are put in a position to command and control, there is competition between the workers and upper level management. Depending on how valuable employees are to an organization, they are given different incentives and rewards to make sure that the employee continues to put the goals of the organization ahead of their own. There is a great deal of competition in a bureaucracy and very little cooperation.

### **2.2.2 MARKET**

The market is a governance structure that is based on a market economy. There is supply and demand. Depending on the balance between the two, there is either competition between suppliers or buyers. Selection of either is based on quality and cost. When the goals of a seller and a buyer are in agreement, they enter into a contingency contract which outlines the terms of exchange. This contract is in effect until the terms have been met in full which can be immediately or of a long duration. Shopping at the supermarket is a good example of a contract of immediate exchange and consulting is a

good example of a contract with a specified duration. Buyer and seller cooperate with one another as long as the terms of the agreement are being met. If either party feels that the other has defaulted on the contract, buyer and seller are put in competition.

### **2.2.3 COOPERATIVE**

Cooperative governance is based on a relationship economy [Mollner 92]. Selection of individuals that make up a cooperative is based on whether they share the goals of the organization. If they do share the goals of the organization, they enter into a social contract as acknowledgment of sharing the same goals. A good example is a an actor's voluntary involvement with a church. "If you go to church and accept its teachings and philosophy, you are accepted by it, and receive the benefits. If you don't like it, you can leave. The church is still there, and you get none of the benefits." [Krol 92] Another similar example of an organization made up of social contracts is the Internet Society, which is what Ed Krol was referring to in the previous quote. There is no competition in a cooperative, which is no to say there is no conflict. Conflict happens in competitive as well as cooperative environments and is usually beneficial to each because it stimulates creative thinking. The difference between competition and cooperation when it comes to conflict is resolution. It is more difficult to achieve resolution in a competitive environment than it is in a cooperative one.

It is important to make the distinction between cooperative governance and collaboration. Cooperative governance results in a federation and collaboration results in a confederation. Charles Handy describes a federation as an organization "with a greater common purpose, within which sacrifices and compromises are acceptable, one in which the rich are readier to help the poor, one with common standards and common aspirations." [Handy 94]. A confederation, on the other hand, is "an alliance of interested parties who agree to do something together. It is a mechanism for mutual advantage. There is no reason for sacrifice or trade-offs or compromise unless it is very obviously in one's own interest." [Handy 94]. Hamel et al. describe collaboration as "competition in a different form" [Hamel 89]. So, while many associate collaboration, strategic alliances, and partnering with cooperation and cooperative governance, they are really another form of market governance.

## **2.3 BALANCE OF COMPETITION AND COOPERATION**

Competition is a "rivalry between two or more persons or groups for an object desired in common, usually resulting in a victor and a loser or losers but not necessary involving the destruction of the later.[Stein 71] The definition of a rival is "a person who

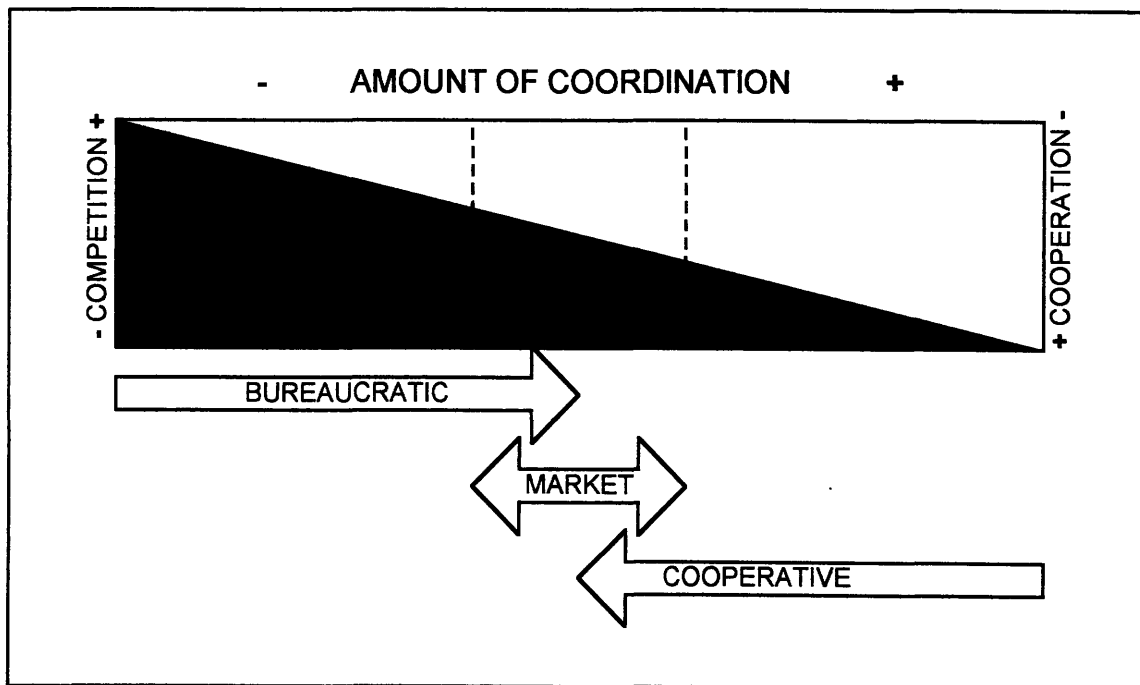


is competing for the same object or goal as another, or who tries to equal or outdo another". In a market economy, the benefit to the market competitor is attaining the "object", which can be a job, a promotion, or a contract. For every winner, however, there are many losers which receive nothing and must compete more intensely in order to survive. The terms "survival of the fittest" and "Darwinism" are often used to describe competition.

Cooperation is defined as an "activity shared for mutual benefit" [Stein 71]. Cooperation is not, doing what you are told to do, as so many students are led to believe in school [Johnson 92]. The goal of cooperation is not to attain an "object", like in competition, but to achieve "the common good". Cooperation builds relationships, trust, and the ability to coordinate. Where competition fosters compromise. The difficulty is that the benefits of cooperation are difficult to measure because actors benefit in different ways at different times. It is much easier in competition because either you have the "object" or you don't. You are either a winner or a loser. Because it is so difficult to measure the benefits of cooperation, it is easy to exploit other actors by taking more than is given. However, as long as both actors feel that there is an equitable distribution of benefits, cooperation will most likely continue. This is referred to as "rational trust". "Blind trust" is when an actor stops evaluating how equitable the distribution of benefits between actors are and continues to cooperate [Salazar 93]. This actor is easily exploited.

Competition is an efficient way to selecting actors based on ability and performance, but it is an inefficient way to select actors based on their ability to coordinate. An analogy of this would be to select all the parts going into a car based strictly on their price/performance ratio and not whether they work together or not. The result would be a car made up of all of the best parts which, in all likelihood, would perform much worse than the lowest performing car made by any single maker. The selection of actors to a cooperative is based on cooperation, which is an efficient way to select actors based on their ability to coordinate but, an inefficient way to select actors based on ability and performance of activities. An analogy of this would be to select the players on a soccer team based on their ability to coordinate rather than their ability to soccer. The result would be a team that could coordinate better than any other team, but would be unable to beat the worst of teams. Clearly, there has to be a balance between competition and cooperation within an organization. Governance affects this balance and should be selected based on how important ability, performance, and coordination are to an organization.

Competition and cooperation are both necessary for the efficient delivery of a building. Competition is needed to promote innovation, regulate cost, time and quality, and improve activity performance skills. Cooperation is needed to facilitate coordination between actors. The balance between competition and cooperation for any given project depends entirely on the amount of coordination that is needed. When the amount of coordination required for the delivery of a building can be reduced through the use of vertical coordination mechanisms or by reducing the complexity, uncertainty, number of activities and actors, diversity of outputs, and/or performance goals of a project then, competition should out-weigh cooperation. On the other hand, if the amount of coordination required for the delivery of a building cannot be reduced and the project teams' ability to coordinate must be increased through the use of lateral in addition to vertical coordination mechanism then, cooperation should out-weigh competition. Figure 2 shows the balance of competition and cooperation along with the applicability of each type of governance.



*figure 2. Balance of Competition and Cooperation*

## **Chapter Three: Case Study of the Watch Tower Society**

The following case-study was undertaken to provide concrete examples of the mechanisms which can be used to facilitate coordination within an organization. The organization chosen was most suitable for case-study on four counts: first, the organization is based on cooperation which facilitates coordination; second, it exists within a competitive environment; third, the organization remains stable even in the face of continued global expansion, and fourth, the organization performs a majority of its own construction. The organization studied in this chapter is the Watch Tower Bible and Tract Society of Pennsylvania, better known as Jehovah's Witnesses. The fact that this is a religious organization has no bearing on this thesis.

### **3.1 BRIEF HISTORY<sup>2</sup>**

In 1870, Charles Taze Russell formed a Bible study class with acquaintances from Pittsburgh and Allegheny, Pennsylvania. The purpose of the Bible study class was to search for Scriptural truth. The Bible study class grew and multiplied into congregations. In 1884, Zion's Watch Tower Society was legally chartered in Pennsylvania. The Watch Tower Society published literature that was being read by "truth-hungry people" around the globe. Newspapers also began to publish Russell's articles. The strength of the Watch Tower Society was tested in 1916 when Charles Taze Russell died at the age of 64 years. J.F. Rutherford became the president of the Society. At this point, many of the congregations were split as to what they should do and if J.P. Rutherford was the correct man to lead the organization. In the end, there were those individuals which chose to split and form sects around Charles Taze Russell's teachings and those, under the direction of J.P. Rutherford, which continued to preach Scriptural truth as interpreted from the Bible. The Watch Tower Society continued to grow as a result of Rutherford's push for each Bible Student to preach from house to house on a regular basis. In 1931, the Bible Students adopted the name Jehovah's Witnesses by resolution at an annual convention of the Watch Tower Society.

In 1942, N.H. Knorr became the third president of the Watch Tower Society when J.F. Rutherford died at the age of 73 years. N.H. Knorr's biggest contribution to the Watch Tower Society was his bringing the organization closer to the "heavenly organization", as interpreted from the Bible. As of 1992, there were 69,558 congregations in 229 different lands and the total population of Jehovah's Witnesses was

---

<sup>2</sup>Unless otherwise noted, references made in the case study come from [Witness 93].

4,472,787. Independent of language, race, or creed, The Watch Tower Society continues to grow in size and strength because of the way they are governed and the coordination mechanisms which are used.

### **3.2 CONSTRUCTION**

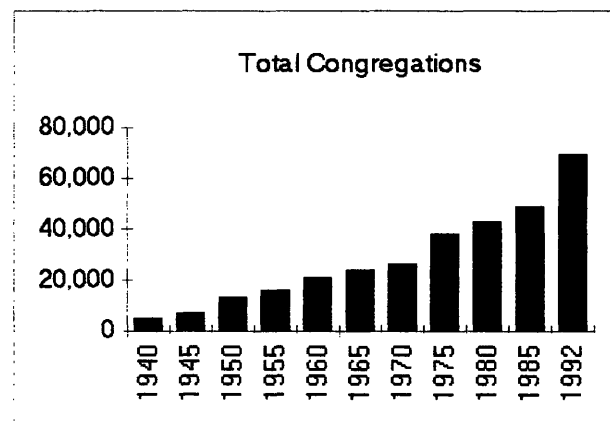
The Watch Tower Society performs the design and construction for most of its buildings around the globe. The buildings include Kingdom Halls<sup>3</sup>, assembly halls, printeries, factories, educational facilities, housing, etc. Only in instances when The Watch Tower Society lacks the required skill base, or if an outside organization can provide a building or portion of a building cheaper, or given the political and legal climate does The Watch Tower Society subcontract for the delivery of its buildings. Project teams are put together to coordinate the delivery of buildings for The Watch Tower Society and are based entirely on the voluntary labor of individuals within the organization. Depending on the difficulty of the job, projects are made up of individuals from congregations, regional building committees, and the design and construction departments at the headquarters in Brooklyn.

The Watch Tower Society's need to coordinate their own construction activities began with the Kingdom Halls. In the first days of the Bible study classes in 1870, the classes would meet in people's private houses, shops, or miscellaneous other spaces. When their space needs increased, they made arrangements to rent larger meeting halls. As it became increasingly difficult to rent adequate facilities for assembly and storage of equipment, the Bible study classes began to build their own buildings to serve the members in the region. These facilities would eventually, in 1935, be referred to as 'Kingdom Halls'. Until 1970, each congregation was responsible for coordinating the design and construction of their own Kingdom Hall. They were responsible for financing, designing, documenting, recruiting volunteer labor, ordering materials, scheduling activities, actual construction, etc. In order to pay for these buildings, the congregations relied on donations of money, materials, and labor from the members of the congregation. At this level, there was little that distinguished a congregation from a project organization. The efficiency with which a building was delivered was dependent on what kind of skills the voluntary labor brought with them. Volunteers that were skilled in a building trade trained and supervised other volunteers to perform the activities. This was also true for volunteers with skills in design, real estate, and/or project management. Unfortunately, there was no mechanisms that allowed

---

<sup>3</sup>A Kingdom Hall is a building where congregations meet.

congregations to share the valuable lessons learned while building a Kingdom Hall. Due to the number of Kingdom Halls being constructed, see figure 3, they had to become more efficient and not reinvent the wheel with each new building.



*figure 3. Number of Kingdom Halls*

So, in the 1970's, they began to standardize the process of constructing Kingdom Halls. By 1986, Regional Building Committees were set up across the United States and abroad to help congregations make the best use of their limited resources through the use of established standardized techniques. Members of the committees were selected based on any experience that they might have in real estate, engineering, construction, business management, safety, or other related fields and, most importantly, on their ability to coordinate the goals of the organization. Engineering and construction departments were also set up at The Watch Tower Society's headquarters in Brooklyn to provide design services for congregations. As the need for assembly halls, printeries, and branch facilities increased, however, the designs for Kingdom Halls had to be standardized in order to keep up with the need for these other facilities. Congregations are still responsible for coordinating the construction of their own Kingdom Halls, but it has been made more efficient through the standardized designs and construction processes.

The design department at the Watch Tower Society headquarters in Brooklyn is organized by a matrix structure which consists of functional departments; Architectural, Structural, Civil, Mechanical, and Electrical; along with project coordinators who head up teams of people from the different departments. The matrix allows The Watch Tower Society to make good use of their limited skill base. That way, the skilled individuals can train other individuals and have an impact on more projects than if they were assigned to only one team. Projects are managed in phases. The phases, in the order that they happen, are: 1) Preliminary Design, 2) Final Design, 3) Working Drawings and

Specifications, 4) Construction and Shop Drawings, and 5) Project Close-out. Because the Watch Tower Society performs both design and construction of their buildings, there is coordination between design and construction throughout all phases of a project.

### **3.3 GOVERNANCE**

The Watch Tower Society is currently a Theocracy, which is a type of cooperative governance. In a cooperative, the members of the organization share a common goal, a social contract, which unites them as one. In the case of a Theocracy, the shared goal is "the union of the personal soul with God" [Stein 71]. Each organizational level of The Watch Tower Society is governed primarily by cooperation with the exception of the Watch Tower Society itself. The Watch Tower Society is in competition with all organizations that do not uphold the sovereignty of God as outlined in the Scriptures.

Jehovah's Witnesses refer to the world that we live in as "the system of things". In this "system of things", there is Jehovah's "heavenly" organization and there are all other organizations. Clearly stated, "There are two distinct and opposing organizations -- Jehovah's and Satan's". In what is referred to as "a universal court case" [Witness 93], there are those that are arguing for God's sovereignty, Jehovah's Witnesses, and there are those that are arguing for the human self, everyone else. The competition between these opposing organizations is fierce as evidenced by the persecution of Jehovah's Witnesses in the last century.

The Watch Tower Society was legally registered in 1884. A board of directors was needed as part of the legal instrument and Charles Taze Russell was the first president of the Society. Branch offices were opened in other countries as well, with their own board of directors and presidents, but these were only legal instruments as well. The Watch Tower remained an "association of brothers" [Witness 93]. In 1944, the Society focused on their governing body in order to bring it closer to the theocratic principles. Upon unanimous vote, it was determined to change the Society's charter. In the Society's new charter, membership would be unlimited in number, but range between 300 and 500. These members of the governing body would be chosen by the board of directors from the persons that are mature, active, and faithful Witnesses of Jehovah serving the organization full time. This group of individuals would select the board of directors, limited to seven individuals, and then the board would select its officers. In 1971, the number of members of the board of directors became unlimited and the chairmanship rotated every year based on alphabetical order of the member's last names. The current governing body is made up of the board of directors and six committees, which are as follow: Chairman's Committee, Writing Committee, Teaching Committee,

Service Committee, Publishing Committee, and the Personnel committee. These changes were believed to bring the organization closer to the theocratic principles of Jehovah's organization as outlined in the Scriptures.

The individuals that make up the Watch Tower Society are referred to as "brothers" and "sisters". Each one of them is Jehovah's witness and volunteer their resources, time and money, to the organization. The amount of time or money that is donated is not specified and is based on what the individual wants to give. There are individuals that have secular jobs which allow them to donate money as opposed to time. On the other hand, there are individuals that volunteer most of their time to be missionaries or to work at Bethel homes<sup>4</sup>. Both are necessary to the stability and growth of the Watch Tower Society.

All Jehovah's Witnesses share the same goal as The Watch Tower Society itself, to uphold the sovereignty of Jehovah, and there is a social contract between each individual and the organization. This goal, however, is weighted against other personal and professional goals differently depending on the individual. The governance of an individual that is a missionary or lives and works at a Bethel home is different than an individual with a secular job. For a missionary or Bethelite<sup>5</sup>, there is no distinction between personal and professional goals. The goal and social contract shared with the Watch Tower Society is their only goal regardless of what they are doing, whether it be working or socializing. Because there is no distinction, these individuals are always presenting the views of the organization. The individuals with secular jobs, however, have goals and aspirations regarding their work or profession in addition to the goal that is shared with The Watch Tower Society. These other goals result in employment, spot, or negotiated contracts with other organizations. Depending on an individuals priorities, these contracts may be more or less important than the social contract with The Watch Tower Society. These separate contracts place an individual in competitive as well as cooperative environments. This is important for two reasons. First, the Watch Tower Society relies on secular organizations for the acquisition of skills and capital. Without them, the organization would not have been able to grow in stability and size. Second, the competitive behavior that is learned in secular jobs is in opposition to the cooperative behavior that is used within the Watch Tower Society.

---

<sup>4</sup>"Bethel" means "house of God" and is a complex of buildings where Jehovah's Witnesses live and perform work for the organization. The Watch Tower Society Headquarters in Brooklyn, New York, is a Bethel home. Each individual that works at Bethel, in Brooklyn, is given room, board, amenities, and \$90 a month in exchange for the work that they perform regardless of the job he or she performs. There is a long waiting list to join a Bethel home because it is considered an honor to live and work at one.

<sup>5</sup>Person that lives and works at a Bethel home.

Brothers and sisters that live in the same vicinity join together to form congregations. There are individuals which supervise each congregation, but they do not represent a clergy<sup>6</sup> class which preaches to the laity<sup>7</sup>. From the days of the first Bible study class, "Russell was determined that there would be no clergy class among them." [Witness 93]. Each and every one of Jehovah's Witnesses are preachers, but there is still a need for supervision. Supervision is required for four reasons:

1. It was evident that the spiritual development of individuals varied one from another. There were temptations, trials, difficulties, and dangers that not all were equally prepared to meet. Thus, there was a need for wise and discreet overseers, men of experience and ability, deeply interested in looking out for the spiritual welfare of all and capable of instructing them in the truth.
2. It had been seen that the flock needed to be defended against 'wolves in sheep's clothing.' They needed to be fortified by being helped to gain a thorough knowledge of the truth.
3. Experience had shown that if there was no arrangement for appointment of elders to safeguard the flock, some would take that position and come to view the flock as their own.
4. Without an orderly arrangement, individuals loyalty to the truth might find their services unwanted because of the influence of a few who disagreed with them.

[Witness 93]

In the beginning, Charles Taze Russell provided supervision and leadership for the members of the Bible study class. But as the Bible study classes grew and multiplied, more supervisors were needed. Selection of supervisors for each congregation was based on democratic procedures. Every year, supervisors would be selected by each respective congregation by democratic vote. Because of the differences of opinion and arguments that ensued, they switched to a secret ballot. While the secret ballot eliminated the problem of confrontations amongst the brothers, it did not solve the problem of brothers voting according to personal preference as opposed to "the Word and spirit of God" [Witness 93]. In 1932, the elected supervisors were replaced with a democratically

---

<sup>6</sup>*Clergy* is "the group or body of ordained persons in a religion, as distinguished from the laity"[Stein 71].

<sup>7</sup>*Laity* is "the body of religious worshippers, as distinguished from the clergy; the people outside of a particular profession, as distinguished from those belonging to it; those lacking professional knowledge of a specific subject." [Stein 71]



elected service committee made up of a chairman, who ran the meetings, and a secretary and treasurer. By resolution in 1934, it was determined that the "service committee" for each congregation would be appointed by the Society from a list of the most mature and qualified brothers. In the 1970's, the "service committees" were changed from having one supervisor to having many. Their selection was still appointed based on how they met the Bible's requirements. They were referred to as the "body of elders". Individuals in supervisory roles supervise in addition to the other activities they perform within the organization. They do not only supervise. Supervisors receive no extra compensation or reward with the exception of the honor of serving in Jehovah's organization.

### **3.4 COORDINATION MECHANISMS**

The following mechanisms are used to facilitate coordination within the Watch Tower Society. The rapid global expansion of the Watch Tower Society and their ability to keep up with their increasing need for facilities are testaments to the effectiveness of these mechanisms within the organization. Following this case study, these mechanisms will be applied to the construction industry.

#### **3.4.1 MECHANISM 1: COORDINATORS**

As previously mentioned, the structure of the engineering department of the Watch Tower Society is a matrix. The reason for this is to make the best use of the skilled personnel that they have. Only about 10% of the personnel within the engineering department at headquarters are licensed architects or engineers. So, there are departments and coordinators that integrate them. A project coordinator oversees a project from beginning to end. There are also CAD coordinators from each discipline which comprise a formal group to set and maintain standards.

#### **3.4.2 MECHANISM 2: COORDINATION STAMP**

The coordination stamp is a mechanism to coordinate a project between the different departments within the matrix. It is very much like a stamp used to approve shop drawings. Before a project moves from one phase to another, i.e. preliminary design to final design, the coordination stamp on each sheet must be signed by eight different people/departments: Project Coordinator, Mechanical Department, Electrical Department, Structural Department, Construction Office, Engineering Office, Codes Department, and Quality checking. Each of these entities marks up the drawings with their designated color pen. Once a person has reviewed and marked up the set of drawings (in their specified color of ink) they sign the stamp. These comments are then

transcribed and distributed to all those entities on the stamp. Each one of the comments must then be addressed and resolved before the project advances to the next phase. Interesting to note is that the construction department gets to comment from the beginning of the project and there is an individual whose sole purpose is quality control.

### **3.4.3 MECHANISM 3: INFORMATION TECHNOLOGY**

The design and construction departments at the WTS headquarters in Brooklyn are fully computerized. There is no manual drafting. This, I must admit, came as a shock to me given the limited skill base. I was told, however, that they had gone through a transition period with CAD. As they began to use CAD, they figured that a sheet drawn by hand took 40 to 45 hours to complete and the same sheet done by computer took 185 hours. This loss of productivity was a major concern. Was the computer less productive than hand drawing? Eventually they arrived at the core reasons for the ineffectiveness of CAD. The first problem was they had no CAD standards. Each operator had their own rules, which made the transfer of CAD documents almost impossible between departments. The second problem was that designers could not think artistically and satisfy the computer standards at the same time. Third, architects always want to reinvent the wheel and engineers always want to do something better. Eventually, these problems were addressed and they could not afford to draw things by hand because of their newly found efficiency.

Standards were developed but, the designers still felt constrained by them. The designers acknowledged some of the standards, but rather than force them, they assigned CAD drafters to review their drawings and bring them up to the standards. This was easier than trying to change the way the designers thought. These drafters were put through 6 week training classes to learn the standards. The last problem of reinventing the wheel solved itself simply because there was too much work to be done. Electronic data promoted reuse.

### **3.4.4 MECHANISM 4: STANDARDS**

We have already seen how the Watch Tower Society used standardized procedures to keep up with the increased need for Kingdom Halls around the globe. In order to continue to keep up with the rapid global expansion of Kingdom Halls and other buildings without significantly growing the design and construction departments, the Watch Tower Society has had to develop many other standards, as well. These standards increase the efficiency by which they design, construct, and coordinate between design and construction. Standards also allow the Watch Tower Society to capture knowledge

that could be of use to others in the future. Following are a few examples of how standards are implemented in the construction of buildings by the Watch Tower Society.

#### **3.4.4.1 QUESTIONNAIRES**

To make the most efficient use of the limited design and construction resources at headquarters, a series of questionnaires have been developed. These questionnaires outline the information that is needed at the outset of a project. The questionnaires address information like program requirements, local codes, zoning, survey requirements, geotechnical reports, etc. These questionnaires are sent to the regional building committee or the nearest congregation to be filled out which frees up headquarters to make the most efficient use of its skilled people. Also, the needs and regulations are so different depending on what part of the world you are in so, it is more efficient to gather the information at the source. Once all of the information is compiled, it is sent back to headquarters where the project coordinator starts the project. One of the difficulties is that the people doing the design never get to see the site and have to rely on this codified information and photographs taken of the site.

#### **3.4.4.2 STANDARDIZED DESIGNS**

Once something is designed, reuse of that design is a source of increased efficiency. Rather than "redesign the wheel" every time a design problem comes up, the Watch Tower Society has binders and binders of standard designs that can be used in their entirety or slightly altered given different conditions. These are very similar to those found in commercially available Architectural standards.

The Architectural and Engineering departments at The Watch Tower Society's headquarters in Brooklyn were providing design and documentation of Kingdom Halls for congregations. However, the increasing need for branch facilities, assembly halls, factories, etc. forced them to standard the design of Kingdom Halls, so they could spend their time on these other buildings that needed attention. As I was touring the factory where most of the domestic printing was done, I noticed that they were actually publishing the working drawings for a number of standard Kingdom Hall designs. All a congregation has to do is select a design and all the necessary documentation would be sent.

#### **3.4.4.3 STANDARDIZED SKILLS**

The Watch Tower Society has training programs that give workers the skills that they need to perform certain functions in the building process. Because there is a limited

skill base and they do not have the resources to continually manage workers, they have to give people the skills that they need. They have various training programs which are run by overseers which are both spiritually and professionally qualified. Once, individuals complete these training courses, they are given a diploma showing their qualification. Depending on the needs in the departments and the qualifications of members, they may be trained in many skills or they may never need to be switched. A secondary effect of training for skills is that the rotation builds up an informal network of workers that can impact how a project gets completed.

#### **3.4.4.4 GRAPHIC STANDARDS**

CAD standards were developed for each of the departments, architectural, mechanical, and structural. These standards were compiled into a master standard called MECS (Multilanguage Electronic Construction Standards). These standards allowed the interdepartmental transfer of design information which increased efficiency. Each of the departments had their CAD layers which made it easier to manage the drawings and allowed the notes to be translated into different languages. Because these drawings could be for use any where in the world, they had to be universally understood so, symbols, line types, drawing conventions, etc. had to be standardized. In many cases, textual information can not be translated adequately so, they have to rely strictly on graphic images to communicate.

#### **3.4.4.5 SPECIFICATIONS**

The Watch Tower Society has standardized specifications that are required for the regulatory agencies and for the portions of work that must be contracted outside of the organization. Specifications are no different than the ones in use in the commercial construction industry in that they typically read like contracts. This comes as no surprise because specifications usually are a part, along with the construction drawings, of the contract documents. The Watch Tower Society has also developed another more user friendly specification. A specification which describes with words and pictures how something is supposed to be built. This is rarely done in the commercial construction industry, where the design and construction are done by separate entities, because there are legal restrictions that prevent the designer from determining means and methods of a construction project. Because the Watch Tower Society is vertically integrated, they can use these types of standards.

Construction procedures are standardized and documented in more of a user friendly format. They use a lot of step by step graphics and easy to understand

descriptions that are actually incorporated into the construction drawings. An example is the procedures for "tilt-up" construction. "Tilt-up construction is when a concrete panel is poured flat on the ground and then lifted on end to become a wall panel. The problem that the Watch Tower Society was having was that the concrete "tilt-up" panels would develop cracks during construction. It turns out that the construction workers were not lifting the panels as specified in the written specifications putting the panels through stresses that were not accounted for by the design. To solve the problem of the cracks, the structural engineer developed a standard procedure for lifting and installing the concrete panels and graphically described these procedures as a part of the construction drawings. Graphic solutions are preferred so that language does not become a problem.

#### **3.4.4.6 QUICK CONSTRUCTION TECHNIQUES**

Quick Construction Techniques are used to complete the majority of construction, of a Kingdom Hall, over a weekend. This would allow them to keep up with the increasing demand for Kingdom Halls and it was also easier for the volunteer workers, who had jobs they had to be at during the weekdays and field service during the nights. A group, consisting of congregation supervisors, began to develop techniques that would enable other congregations to coordinate their own construction activities and make more efficient use of limited resources. These techniques outlined procedures for design, securing building permits, and having the foundation, concrete slab, plumbing, and electrical service completed and necessary building materials on site before the big weekend. Volunteer labor would be solicited and a rough approximation of the number of people and the number of skilled workers was made in order to develop a construction plan. The number of volunteers could range in number from twenty to two thousand. In both situations, coordination is critical to reaching the goal of completing the majority of construction over one weekend.

The brothers that would supervise construction and oversee the workers would get together, prior to the weekend, to work out the details. On Friday night, the volunteer labor would show up and would watch a slide show of how the project is going to progress. Unskilled volunteers would be supervised and trained by the overseers. As volunteers became more skilled, they required less supervision and would be in a position to train others, if needed, on the construction of other Kingdom Halls. Saturday morning, the construction begins and does not stop until the building is complete sometime Sunday afternoon.

A mechanism used to ensure that people continue to work together is Prayer. Each day, the brothers stop at a designated time and listen to a discussion of the

Scriptures. Behavior is very important to the success of these projects, as stated by the Jehovah's Witnesses, "There was no competition, no rivalry among tradesmen.". As for the quality of construction, one inspector said of the suspicious, "if they want to see something done right, they ought to visit the hall. These techniques spread overseas as well.

#### **3.4.4.7 QUICK DRAWING TECHNIQUES**

Quick Drawing Techniques are very similar to "Quick Construction Techniques", except that they relate to the design of Kingdom Halls. Brothers skilled in design and drafting would meet over a weekend and produce construction documentation for a number of Kingdom Halls. They refer to these as "Quick Draws".

#### **3.4.5 MECHANISM 5: QUALITY CONTROL**

There is a person assigned to a project organization who's primary activity is quality control of the construction documents. They are not there to protect a certain department, but the project organization as a whole. Construction documents are reviewed by this actor in addition to all the other actors listed on the coordination stamp. All actors perform quality control as well, but the quality control actor is looking for inconsistencies between actors work as well.

#### **3.4.6 MECHANISM 6: DIRECT SUPERVISION**

Supervision is based on efficiency rather than power. Actors that supervise other actors do so because they have a skill that the others do not, whether it be the ability to perform an activity or coordinate them. There is no competition between actors to become supervisors and there is no need for supervisors to withhold information to protect their job. What you get is an efficient way to transfer knowledge throughout an organization.

#### **3.4.7 MECHANISM 7: MARKETING**

In 1870, when Charles Taze Russell began the Bible study classes in Pennsylvania, those present would come up with questions concerning the world around them. These questions would be discussed by the Bible study group and related scriptures from the Bible would be referenced. Once they were satisfied with the research, they would conclude and make a record of their interpretations. These recorded interpretation of the Scriptures, which related to a specific question regarding the current state of the world, would become standards for future use. The Bible study class began

to see "Scriptural truths" as they continued to reference the Bible. Over the years, the Watch Tower Society used many different mechanisms to advertise these spiritual truths as stated by Melvin Sargent in 1987 at the age of 91:

"Those of us inside the Lord's organization have tried in every way possible, to turn [the world's] attention to the message of life. We have used slogans, full-page advertisements, radio, sound cars, portable phonographs, gigantic conventions, parades of information-walkers carrying signs, and a growing army of house to house ministers."

Melvin Sargent [Witness 93]

While the primary goal of "advertising" The Watch Tower Society was to spread the word and grow the organization, it also acted as a mechanism to coordinate the message of Jehovah's Witnesses all over the globe. Essentially, everyone is marketing the organization and they are all, in turn, strengthened by the material that they are marketing.

### **3.4.7.1 PUBLICATIONS**

In 1879, Russell began publishing "Zion's Watch Tower and Herald of Christ's Presence", a publication which was used "to uphold Bible truths and to refute false religious teachings and human philosophies that contradicted the Bible" [Witness 93]. There were also other publications, but the Watch Tower was, then, and still has the greatest distribution. The first issue of the Watch Tower had 6000 printed copies in one language. By 1992, the average printing of the Watch Tower was 15,570,000 copies in 111 languages. Such broad distribution of publications was only possible because of standards. Without standards, translations could lead to misinterpretations, alterations, and or compromises. Publication has been greatly aided by the use of the computer, but incompatibility of commercial hardware and the software for most languages was nonexistent proved to be a major obstacle. Currently, the Watch Tower Society has a Multilanguage Electronic Phototypesetting System (MEPS) which consists of fully compatible printing and maintenance operations along with the software that allows the Watch Tower Society to process material for publication in 186 languages.

This published material would, at first, be distributed by "Colporteur evangelists" that traveled across the country and abroad and then, by Jehovah's Witnesses as part of

their field ministry<sup>8</sup>. Charles Taze Russell's articles were also run in newspapers in order to reach those that had not been reached by the "evangelists". There were more than 2000 newspapers in this country and abroad that ran his articles with an estimated readership of 15,000,000 in 1913.

#### **3.4.7.2 MULTI-MEDIA**

In 1914, after two years of preparation, the Watch Tower Society exhibited the "Photo-Drama of Creation". This was an eight hour multimedia presentation that included motion pictures and slides set to voice recordings. The purpose of the exhibit was to build up appreciation for the Bible and to promote the sovereignty of Jehovah. This exhibition was advertised and traveled across the United States, Canada, Europe, Australia, and a reduced version traveled to the rest of the globe.

#### **3.4.7.3 RADIO**

Two years after the first radio station went on the air, in 1920, the Watch Tower Society began to broadcast Bible truths over the air waves. By 1924, the Watch Tower Society had its own radio station, WBBR, in New York. By 1933, there were 408 stations being used to delivery the broadcasts to six continents. These broadcasts were also recorded so that they could be heard by those not reached by the radio stations.

**3.4.7.4 FIELD MINISTRY** The Bible truths, up until this point, were being publicized by a small portion of members relative to the its increasing size of the organization. In 1922, the Watch Tower Society urged all of members to "advertise" the Scriptural truths in the Bible. This program was not very successful in the early days, because most people were not comfortable talking with strangers on their doorsteps. Also, many did not feel comfortable with their amount of knowledge of the Scriptures. In order to overcome this problem, these people were given a card with a message on it and a portable phonograph. They would arrive at the doorstep and present the person with the card for them to read and then play a recorded message on the phonograph. In addition, the member would leave Watch Tower Literature. Over time, the Watch Tower Society would begin to train everyone in public speaking so that they would have the skills to deliver the message rather than just being the carrier of the message.

---

<sup>8</sup>*Field Ministry* is when Jehovah's Witnesses go door to door advertising Jehovah's organization.



#### **3.4.7.5 INFORMATION TECHNOLOGY**

The Watch Tower Society has historically latched on to new technologies that would help in their efforts to deliver Jehovah's message. Modern day communications and computers are no exception, but they are not being used as one might expect. One might expect to run across a Jehovah's Witness tele-preaching or surfing the Internet with their beliefs, but it doesn't happen. The Watch Tower Society has informally suggested that this not be done and they continue to support the field ministry. This way Jehovah's Witnesses can use mutual adjustment as their primary coordination mechanism. The ways that communications and computers are being used by the Watch Tower Society are all related to internal coordination. One example is P-Mail, similar to E-Mail, which is used as an informal lateral coordination mechanism. Also, Jehovah's Witnesses who work at headquarters or a branch office share in communal meals where there are numerous television monitors and speaker systems that allow for coordination amongst various branches within the same time zone.

#### **3.4.8 MECHANISM 8: CONVENTIONS**

Conventions are used to coordinate the efforts of individuals and congregations around the globe. The first convention was held in Allegheny, Pennsylvania, in 1891. These conventions would become a yearly occurrence as the organization continued to grow. These conventions were and still are beneficial for Jehovah's Witnesses to listen to speakers and to come in contact with brothers from different congregations, districts, or even countries in order to strengthen their shared goal to uphold the sovereignty of Jehovah. Conventions are an example of both informal lateral coordination and direct supervision.

#### **3.4.9 MECHANISM 9: COMMITTEES**

There are six committees, as previously mentioned, which are a part of the governing body. They are the Chairman's Committee, Writing Committee, Teaching Committee, Service Committee, Publishing Committee, and the Personnel committee. There are also other committees which oversee different aspects of the organization like the construction of Kingdom Halls, for instance. Regional Building Committees were established in 1986, so the Society could better coordinate the construction of Kingdom Halls to assure the most efficient use of resources. The United States was divided into 60 Regional Building Committees that would oversee where Kingdom Halls are needed most, the types of skills that are available in an area, and provide guidelines provided by the Society. The members of these committees were selected based on their knowledge

of some aspect of the construction industry, their maturity, how active they are in field ministry, and how faithful they were to Jehovah's organization.

Congregations would consult their Regional Building Committee if they were thinking about constructing a hall. Depending on how many other halls are in the area the committee would make suggestions about location. In many cases, neighboring congregations would both be planning to build a hall and these could be either combined or relocated to reach the most number of people.

#### **3.4.10 MECHANISM 10: FLEXIBLE WORKFORCE**

Individuals are typically assigned to a job that they have experience in. The Society likes to make the best use of the limited resources that they have got. If they do not have a particular skill or if there is a strong need in another area, they will be trained to perform that job. Typically, in construction, volunteers are selected based on their skills so as to minimize the amount of training that must go on in the design department.

One of the difficulties with the matrix organization and having separate departments is that if a department is not busy, productivity declines. The Watch Tower Society eliminates the problem by re training volunteer workers to redistribute them to where they are most needed, they eliminate the problem. For instance, the head of the structural department was actually formally trained as an architect. Because there was a need for structural engineers, he was re-trained and is now running the structural department.

## **Chapter Four: Analysis**

### **4.1 ROLE OF GOVERNANCE**

The project organizations created by the Watch Tower Society to deliver a building are structured very similarly to those in the construction industry. In both cases, project teams are put together. A project team is a form of lateral coordination mechanism that brings various specialists, whether they are individuals or entire organizations, together to accomplish something. In this case, it is to deliver a building. Once the building is delivered, the project team ceases to exist and its former members move on to join other teams. The governance of project teams is greatly affected by the governance of the individuals and organization that comprise them because of the impermanence of project teams. Because the governance of the Watch Tower Society and other construction industry organizations varies greatly, so does the governance of the project teams created by both.

Organizations are comprised of any number of individuals and can provide anywhere from a single activity to all of the activities necessary in the delivery of a building. They can be governed by any of the three types of governance described in chapter 2: bureaucratic, market, and cooperative. The Watch Tower Society uses cooperative governance. There are very few organizations in the construction industry which use cooperative governance and, for the most part, they are all non-profit organizations. Habitat for Humanity, which delivers affordable housing, is one example. The selection of actors that make up an organization governed by cooperation is based on individual actors volunteering. Generally, anyone that volunteers is selected because there is no limit to the size of the organization. There is very little competition within the organization because everyone shares the same goals. Most organizations in the construction industry use either bureaucratic or market governance. Organizations that are governed by the bureaucracy maintain employment contracts with individual actors and organizations which are governed by the market rely on contracts with consultants or subcontractors to perform activities. Actors that make up organizations governed by the bureaucracy or the market are typically selected based on competition because the size of the organizations is restricted.

Project organizations that use cooperative governance are comprised of many different actor organizations much like those governed by the market. Selection is based on trust and the ability to coordinate, however, rather than competition and lowest qualified bid. Selection based on trust and the ability to coordinate can lead to lower

costs than the market can provide [Salazar 93], but it can also lead to the inflation of costs do to collusive behavior between actor organizations. There are anti-trust laws which try to prevent collusive behavior, but in so doing, make it more difficult to cooperate. Trust and the ability to coordinate usually develop as a result of successfully working together. Once coordination mechanisms are put in place, coordination on subsequent projects is more effective. Project organization that use cooperative governance in the construction industry are often referred to as "Quasifirms" or "Clans" [Eccles 81] [Ouchi 80].

Project organizations which are governed by the bureaucracy are typically comprised of individuals from a single, full service, organization. Design build organizations compete with one another based on the project organization they can put together in house. Coordination is effective in a project organization because the mechanisms are already in place within the actor organization.

Project organizations that are governed by the market are comprised of many different actor organizations. Selection of actors and or organizations to make up a project organization can be based on lowest qualified bid or it can be negotiated. Regardless, actor organizations that perform 'like' activities compete with one another to become part of the project organization. Once selected into a project organization, actor organizations must coordinate with all the other actor organizations that have an impact or are impacted by their respective activities. Coordination mechanisms must be set up specifically for each project organization.

The advantage to using cooperative governance within project teams is that coordination is facilitated by actors having coordination skills and sharing the same goals as the owner. The disadvantage is that actors may or may not have the necessary skills to perform design or construction related activities which can affect the cost, quality and amount of time it takes to deliver a building. The advantage to using bureaucratic governance within project teams is that coordination is facilitated by the coordination mechanisms already in place within the organization selected to deliver the building. The disadvantage is that bureaucracies are very inflexible as a result of these coordination mechanisms. Competition created by the contingency contract with the owner and the employment contracts with the workers make it very difficult to coordinate the delivery of a building. The advantage to using market governance is that the most skilled individuals and organizations can be selected. Cost, quality and the time of construction can be maintain through the use of contracts. The disadvantage is that it is difficult to predict how well these individuals and organizations will be able to coordinate given that they were not selected on their ability to coordinate with one

another and that they are not all contractually obligated to each other. So, what is more important to the efficient delivery of a building, ability to perform an activity or to coordinate?

Competition produces actors that can perform activities and cooperation produces actors that can coordinate. It can be argued which is more efficient, competition or cooperation. Tom Peters argues for competition when he says "Scientific and economic progress are products of destructive competition" [Peters 92]. Dertouzos et al. argue for cooperation when they say "Underdeveloped cooperative relationships between individuals and between organizations stand out in our industry studies as obstacles to technological innovation and the improvements of industrial performance [Dertouzos 89]. The goal of this thesis, however, is not to determine which is best but, rather, to find out how coordination can be improved in the construction industry so that buildings could be delivered more efficiently. Clearly, the construction industry could deliver buildings more efficiently if it could coordinate better. Likewise, the Watch Tower Society could deliver buildings more efficiently if it had more skilled actors to perform activities, but this is not within the scope of this thesis. The remainder of the chapter will look at the applicability of the coordination mechanisms used by the Watch Tower Society to the construction industry.

## **4.2 APPLICABILITY OF MECHANISMS**

The mechanisms which are used by the Watch Tower Society to facilitate coordination were discussed in chapter 3. The applicability of these mechanisms to the Construction Industry and its constituent Project Organizations will be the focus of this section. The goal is to determine what mechanisms can be used in the construction industry to facilitate coordination.

### **4.2.1 MECHANISM 1: COORDINATORS**

The effectiveness of a coordinator depends on goal congruence. If goal congruence is high, meaning every actor shares the same goal, then coordinators can be very effective. This is the case with the Watch Tower Society. Each actor has volunteered to perform activities based on the goals they share with the Watch Tower Society of which the project organization is a part of. In the construction industry, goal congruence is dependent on delivery method. The three typical delivery methods are fast tracked, design/build, and design/award/build. Goal congruence is highest in fast tracked construction and lowest in design/award/build. There are three reasons for this; first, fast tracked contracts are usually cost-plus employment contracts, second, selection of actors

is based on negotiation, and third, all actors are selected at the beginning of the project. On the other hand, design/award/build contracts are usually fixed, selection of actors is usually based on competitive bid, and selection of actors happens at different times in a project's life. For these reasons, coordinators on fast tracked projects are much more effective than coordinators on design/award/build projects. They are, however, not as effective as the coordinators within a project organization of the Watch Tower Society regardless of delivery method. This is true because of contracts and ownership. In the Watch Tower Society, there are social contracts between the organization and each actor, which effectively means that each actor has a social contract with every other actor and jointly own the building which is being built. In the construction industry, actors in a project organization are not all contracted to one another. Employment contracts only exist between certain actors all leading back to the owner of the building.

Unfortunately, a majority of the buildings in the construction industry are design/award/build. This makes it difficult for any one actor to take on the role of a coordinator within a project organization. The architect consider themselves coordinators, but they are biased by the negotiated contract with the owner and the social contract with the design profession. Also, because a contractor is not selected until after design is complete, architects end up having to protect a design from rather than coordinating a design with the contractor. Construction and program managers are not effective coordinators for similar reasons. The only actor that could be an effective coordinator on a design/award/build project is the owner because all other actors' goals should match the owners and the owner is contractually linked to all actors in the project organization.

#### **4.2.2 MECHANISM 2: COORDINATION STAMP**

The coordination stamp is applicable to project organizations in the construction industry and besides being a good way to coordinate between actors, it is also a good way to keep a record of this coordination. This mechanism is most effective when all actors are selected at the beginning of a project, but can have an impact on coordination regardless of delivery method. One potential problem which could affect its effectiveness is building consensus in a competitive environment. In a competitive environment, each actor will only agree to something if it does not negatively affect themselves. If an environment were more cooperative, however, actors would be more likely to do what is best for the project organization as opposed to themselves. Social contracts are the best way to maintain the common good, followed by negotiated contracts and then employment contracts.

#### **4.2.3 MECHANISM 3: INFORMATION TECHNOLOGY**

Information technology is a mechanism which can be used to vertically integrate information needed during the delivery of a building [Howard 89]. There is a great deal of data already being generated by computers in the construction industry, but only a small portion of this electronic data is being shared via EDE (Electronic Data Exchange). The majority of information in the construction industry is shared via hard copy and as soon as this electronic design data is printed to hard copy, all of the potential benefits of information technology are lost. Using the computer to generate information can lead to increased productivity within an organization, but these gains pale in comparison to those that could be realized if electronic data could be shared between organizations. Until electronic data can be shared between the actors of a project team, information will reinforce rather than eliminate the vertical fragmentation that exists within the construction industry [Howard 89].

There are a number barriers to EDE in the construction industry as outlined in a research paper by William Russell at the Center for Integrated Facility Engineering, Stanford University. The first barrier is the lack of comprehensive software file exchange standards and CAD use standards. Second, statutory law in most states requires a physical ink stamp and signature on design documents. Third, most organizations are concerned about the legal implications of EDE because it has yet to be tested in the courts. [Russell 93]

Many people feel threatened by computers because they have to change and re-learn how to perform activities. The construction industry is in the interesting situation where the older actors have the knowledge without the capability and the younger actors have the capability without the knowledge.

The Watch Tower Society is able to capture the benefits of information technology because they have control over their hardware, software, standards, and there is little resistance to change because they are not concerned about job security or promotion.

#### **4.2.4 MECHANISM 4: STANDARDS**

Standards are difficult to establish between separate organizations. Such is the case in project organizations. The difficulty lies in the fact that it is very difficult to get consensus between the many construction industry organizations and it is not cost effective to set standards on a project by project basis because there is no guarantee that

any two organizations will work together again. Following are each of the different types of standards that are used effectively by the Watch Tower Society.

Questionnaires, Quick Construction Techniques, and specifications are all examples of the standardization of processes. Questionnaires are used to make sure that all of the information needed for a project is gathered. These questionnaires also allow the most efficient use of skilled actors because the questionnaires are written in such a way and in enough detail where anyone can gather the information. In most cases, the owners, the congregation, gathers the information using the questionnaires. Questionnaires are similar to checklists, which are used by most organizations in the construction industry. The main difference is that checklists are used internally and questionnaires are used externally. Actor organizations usually do not spend the time to edit and format the checklists they use in house in such a way so they can be understood by the owner. Actor resist doing this because they do not want to eliminate a service that they provide to owners and they do not want to give away their knowledge to competitors. Quick Construction Techniques standardize the process of delivering a Kingdom Hall. This allows for the efficient use of a congregation's limited resources. In actuality, the process of constructing a building in the construction industry is standardized for efficiency. It is standardized, however, for the efficiency of each actor organization rather than the project organization. The specifications created by the Watch Tower Society standardize the process of construction as outlined by the engineer or architect. This kind of specification is not possible in the construction industry because a designer is contractually prohibited from determining the means and methods of construction for a project. Likewise, the contractor is contractually prohibited from making design decisions. This is a source of competition between designers and contractors because each does not want to be told how to do what they do. This is actually a problem in the Watch Tower Society as well because most of their skilled workers get their skills from working in secular organizations where they pick up these stereotypes.

The Watch Tower Society also standardize output. Examples of these are CAD, graphic representation, and building designs. The difficulty of standardizing CAD and graphics in a project organization were alluded to and discussed in the previous section on information technology. It is difficult to standardize design in the construction industry because designing a building to match an owner's needs is the source of competitive advantage for many organizations whether this means a good functioning building or a building which makes a statement. Owner's needs vary from project to project as well as the site. No two sites are alike and because the site is usually chosen



before the design of a building is done, standardization is difficult. The Watch Tower Society is able to standardize the design of Kingdom Halls because there is little variance between owner's needs and designs are usually selected prior to the selection of a site. There are examples where the design of buildings are standardized in the construction industry, like the construction of warehouses or fast food restaurants.

Skills are standardized in the Watch Tower Society because their skills base is dependent on who joins the organization and who volunteers to work. They generally do not have the number of skilled workers needed and must train individuals to perform activities. There are instances where actors are trained to perform certain activities, which is the standardization of process rather than skills. In instances where actors must coordinate, however, they must be given these skills because coordination can happen in so many ways depending on the situation. A good example of this is the public speaking skills that Jehovah's Witnesses are given for use in their field ministry. A lot of organizations in the construction industry are leery of training actors because they may go off and work for their competition or even start up their own organization because the entry barriers to the industry are so low. Most of the skills required in the delivery of a building are standardized, with the exception of coordination skills. The skill to perform activities are taught at institutions or through internship or apprenticeship. A problem with the construction industry is that coordination between activities is not taught, but has to be learned on the job.

#### **4.2.5 MECHANISM 5:     QUALITY CONTROL**

Project organizations are bound together by a series of contracts between actors.. Quality control happens as a provision of these contracts. Both the contracting party and the contracted party make sure that contract requirements are being met by both sides. It is difficult to assign a single actor responsible for quality control to a project organization in the construction industry because of the diversity of goals. In many ways, construction managers provide quality control, but they tend to share the goals of the owner more so than the other actors.

#### **4.2.6 MECHANISM 6:     DIRECT SUPERVISION**

Direct Supervision in the Watch Tower Society is based on efficiency as opposed power. Because of this, while the organization is very hierarchical, it does not promote status hierarchies from forming. There is no competition amongst Jehovah's Witnesses to become supervisors because it is understood that those most qualified to supervise will be chosen as needed. Those chosen to become supervisors, do so in addition to their

other activities and do not receive additional benefits other than the honor to serve in Jehovah's organization. There are many status hierarchies which have formed in the construction industry as a result of direct supervision that is based on power, command and control. There are owners and employees, executives and managers, and managers and workers. In most cases, selection of individuals to supervise others is based on achievement, qualifications and time with an organizations. These criteria for selection are very similar to those used in the WTS, but there are a number of differences which lead to competitive behavior. These differences which promote competition and status hierarchies are listed below:

- Supervision becomes primary activity
- Supervisory positions are limited
- Selection process is imperfect
- Increased financial reward

This internal competition to ascend the organization is seen by most organizations as a good way to ensure that the best people ascend in the organization and the worst ones are filtered out. Status hierarchies are a good way to select the best actors to perform activities, but the competitive environment that is created is not conducive to coordination. The Watch Tower Society takes the opposite approach. They approach it as if it does not matter who performs the activity as long as there is a cooperative environment so that coordination is effective. Construction organizations are currently paying a lot of attention to reward structures and incentives for team work, but these are temporary fixes. The real problem is the status hierarchies themselves.

#### **4.2.7 MECHANISM 7: MARKETING**

The Watch Tower Society exists to market itself. Marketing performs two functions. First, marketing separates the believers from the non-believers. As stated by Melvin Sargent, a Jehovah's Witness, "This activity has served to divide people--those in favor of God's established Kingdom on the one side, those against it on the other". Second, it strengthens and unifies an organization. Marketing is a very small part of most construction actor organizations and is usually performed by the principle, president, or a very small marketing department. The individuals that make up an organization are seldom put in the position to market the organization because they do not have the skills and are not familiar with the organizations goals and strategies.

#### **4.2.8 MECHANISM 8: CONVENTIONS**

Conventions are good because they create informal networks and standardize behavior. The difficulty with the construction industry, because it is so decentralized, is that there are too many conventions put on by different professional organization each marketing their own goals and interests. There is no single convention that is attended by all the different types of actors that make up the construction industry.

#### **4.2.9 MECHANISM 9: COMMITTEES**

One of the most inspiring signs of cooperative behavior that I witnessed in the construction industry was a committee, the Construction Information Executives (CIE) committee. This committee is made up of the information executives of the larger construction companies across the United States. The goal of the committee is to find out how information technology can be incorporated into the construction industry. This committee is only possible because each member agrees to not use the information that is revealed in a competitive way. There need to be more committees like this one.

#### **4.2.10 MECHANISM 10: FLEXIBLE WORKFORCE**

Having a flexible workforce provides the same benefits as rotation. Informal networks are formed and actors have a good general knowledge of many activities. The construction industry, however, encourages specialist knowledge versus generalist knowledge. This is the reason why the industry is so fragmented. This gets back to the issue discussed in the section on direct supervision and status hierarchies. Competition increases the abilities of actors to perform activities, but decreases their ability to coordinate given the competitive environment created.

## **Chapter Five: Barriers to Cooperative Governance**

Coordination mechanisms are most effective in cooperative environments and least effective in competitive environments and some of the reasons for this were uncovered in chapter 3. The barriers to the effective use of coordination mechanisms are the same as the barriers to cooperation. These barriers along with possible solutions will be looked at in more detail in this chapter.

### **5.1 LOW GOAL CONGRUENCE**

The construction industry is very fragmented. It is made up of many separate and distinct organizations ranging from a two person architectural office to the multibillion dollar construction company. Each of these organizations have their own goals to work towards. These goals can be "intangible", like the architect's goal to create beauty, or they can be "tangible", like most organizations goal to get work and make money. In a sense, they share a similar goal of trying to make money, but that goal is only achieved at the expense of other competitors, due to the limited amount of work.

Like organizations compete with on another to perform specific activities in the process of designing and constructing a building. Once selected, these organizations make up a project organization by virtue of the contracts signed outlining the shared goals between the contracting parties. There are many contacts for most jobs and the terms for each varies depending on the negotiations. So, even though all contracted parties share the goal of delivering a building, they are only concerned with the goals outlined by their own contract.

As previously mentioned, the individuals that make up these organizations have their own goals which vary from those of their respective organization. Their goals concern both their private life and work life. Among the goals concerned with work is promotion of some sort of ascension up the hierarchy. In many cases, individuals must cooperate with other individuals that are up for the same promotion. This internal competition is a barrier to cooperation.

There are a number of things that can be done to bring both organization's and individual's goals closer together to promote cooperative behavior.

#### **5.1.1 CHANGE THE PAYOFF**

Current compensation schemes promote competitive behavior. The owner is trying to decrease costs and project participants are trying to increase cost to increase their profits. The architect usually has no incentive to decrease project costs because

their fee is based on a percentage of the final cost of the building. On the other hand, the contractor has to make up for bidding low through change orders. Compensation should be changed to reward cooperative behavior and penalize competitive behavior.

The individual's goals would be closer aligned to those of the organization and vice versa if there was no distinction between owners and workers. By having a stake in the organization, individuals would be more likely to cooperate. This is also applicable to the organizations that make up a project team in the construction of a building. If each organization took ownership of a portion of the project, cooperation would be increased.

Given the competitive environment, it is becoming increasingly difficult to compensate individuals monetarily. Compensation, however, can take different forms. There are many architecture firms which compensate its employees with rewarding design challenges. There are many designers that would prefer to take a pay cut than to work on an architecturally insignificant building. Maintaining a fun relaxed work environment is another form of compensation. Flexibility, security, and stability are often good trade-offs for profitability.

### **5.1.2 CHANGE FOCUS OF GOALS**

Currently, most goals concern the attainment of something, whether it be money, power, or something else. As long as goals are focused on "tangible" things, there will always be competition. If the focus of organizational and individual goals were "intangible" non-things like the common good or the development of relationships then, cooperation would become easier.

### **5.1.3 CONTRACTING METHODS**

Contracts are an agreement of exchange between two parties. Contracts outline the expected behavior of each party which promotes competition. Under negotiated and employment contracts, each party is put in the position of policing the other in order to ensure conformance. The difficulty in the construction industry is that all parties are not contracted to one another. In other words, the architect and contractor each have contracts with the owner, but not with one another. The result is that the architect has no control or responsibility for means and methods of construction and the contractor has no control or responsibility for the design. Separate contracts make it very difficult to share the same goals. If all parties were linked contractually, by either a single contract or many social contracts, goals would be brought more in line and competitive behavior would be reduced.

One of the difficulties is that many actors within a project organization maintain social contracts with other organizations that may have different goals from those of the project organization. For instance, union workers have a social contract with their union and architects have a social contract with the design community. It is very difficult to build goal congruence when actors are inflexible to other social contracts that they may have.

#### **5.1.4 ACTOR SELECTION METHOD**

The selection of actors depends on the delivery method chosen for a project. Actors can all be selected prior to the start of the project, as in "fast tracked" construction, or they are selected at different milestones in the project, as in "Design-Award-Build". The selection of actors at the beginning of the process promotes cooperation.

The selection of actors is usually based on their ability and willingness to perform an activity. This decision is based on interviews, qualifications, or competitive bid. The competitive bid is a method which uses market principles to select actors. These selections do not take into account an actors goals or ability to coordinate. More attention should be paid to putting project teams together based on actors goals and their ability to coordinate with the other actors as opposed to strictly their ability to perform activities inexpensively.

#### **5.1.5 PROJECT DURATION**

Project organizations remain together only for the duration of the project. Because of the short life and the fact that project participants may never come in contact with the other actors again promotes competitive behavior. If the life of these project organizations was extended or if the actors could be assured of working on other projects together, cooperation would be promoted. Extending the "Shadow of the future" is a recommendation made by Robert Axelrod [Axelrod 84].

### **5.2 STEREOTYPES**

Observable features, like sex, age, skin color, accent, and style of dress, are referred to as *Labels*. [Axelrod 84] There is no information inherent in these labels per se, but actors make associations based on the behavior of others they have come in contact with that have the same labels. These are referred to as stereotypes. In the construction industry, builders think that architects are out to gold plate every detail and architects think that builders are out to cut corners where ever possible. Regardless of

whether these stereotypes are actually true or not, coordination based on stereotypical behavior is a barrier to cooperative behavior. Unfortunately, once started, stereotypes are difficult to stop because actors are continually trying to undo stereotypes about themselves by building up those of others. In order to rid the construction industry of stereotypical behavior, we must stop stereotypes where they form. Stereotypes are caused by a number of things: first, actors' goals and strategies are not known to one another; second, untimely selection of actors; third, education and training of actors; and fourth, limited generalist knowledge.

### **5.2.1 SECRET STRATEGIES**

Stereotypes are formed when an actor must coordinate with another actor that they have never come in contact with before. Because they do not have any previous knowledge of how this actor will behave, they formulate their strategy based on previous encounters with other similar actors. For instance, an architect has never worked with a contractor before, so they assume that this contractor will behave much like the one on a previous job and try and cut corners. The same is true of the contractor, with the exception that he assumes the architect will try and gold plate everything. These assumptions lead to competitive behavior within a project delivery team. Because of the selection methods used for most projects, project teams are usually made up of people that have not worked together before. Two things must be done to eliminate stereotypes: do not conceal goals and strategies, and select actors based on how well they have or will work together.

Actors should make their strategies public knowledge to prevent stereotypes from forming. There is no benefit to concealing one's goals and strategy unless it is to exploit or is easily exploited itself. By honestly revealing goals and strategy, the actors can cooperate from the start. Currently, actors can only cooperate once they decide the stereotypes do not apply, which may not happen until half way through or at the end of the project. There will be instances when an actor will be dishonest in presenting his or her goals and strategies. This competitive behavior is unavoidable. This type of behavior, however, will not support stereotypes, but reputation, instead. A bad reputation is the burden of one actor, as opposed to a group of actors, which is a stereotype.

### **5.2.2 UNTIMELY SELECTION OF ACTORS**

The selection of actors can vary depending on the delivery method chosen for a project, as previously discussed. In addition to selecting actors based on their ability to

coordinate with one another, actor selection should take place at the outset of the project so that the process of design can be better integrated with the process of construction.

Assumptions often have to be made because the appropriate actor has not been chosen yet. The classic example is the architect making assumptions about building costs when designing a building. In most cases, the architect does not have access to the appropriate kind of costing information which the contractors have. Contractors are in a better position to perform more detailed cost estimates than the architect is because that is what they do. Because the contractor is usually not chosen until a design is complete, the architect must make assumptions. In the event that a building comes in way over budget, stereotypes form. In this case, architects are too willing to spend an owners money. On the other hand, architects have stereotypes of contractors as being risk averse and not accurately estimating anything that is out of the ordinary. If actor selection was made at the outset of a project, these stereotypes could be eliminated and building designs would more accurately reflect their budgets

### **5.2.3 EDUCATION AND TRAINING OF ACTORS**

Educators are usually simultaneously working in the construction industry and the stereotypes they have acquired themselves, in practice, usually get passed on to the students. This is true in architecture, management, and the construction trades.

### **5.2.4 LIMITED GENERALIST KNOWLEDGE**

Each of the actors that make up a project organization perform different specialties. Actors have a lot of knowledge about their specialty, but limited knowledge of other actor's specialties. This creates two problems. First, actors do not like being told how to perform their specialties. Second, without a common reference, actor's cannot effectively communicate. Stereotypes form because an actor does not have a full understanding of the activities other actors perform. It is important for actors to not hold on so tightly to their activities and to gain a better general understanding of the entire process.

## **5.3 STATUS HIERARCHIES**

Labels can also lead to status hierarchies.[Axelrod 84] In this case, players make associations based on status. For instance, a player will always cooperate with those players that are above them, but will always defect with those that are below them. So, the players at the top will do better than the players at the bottom because they are always exploiting those players below them. The players at the bottom will always be worse off



because they are continually being exploited while having no one to exploit themselves. In this scenario, the players at the top cannot do any better, so cooperating with those players that are below them would only decrease their payoff. There is no incentive to ever cooperate with those players below them. The players at the bottom, however, can drastically effect the payoff of those above them by competing instead of cooperating because that would only improve their payoff. The problem is that the top players want to prevent this type of behavior so that others below them won't defect also, so they are tough on any player that defects. By being tough on those that defect, they get a reputation. Reputation is another type of label that can alter a player's behavior.

There will always be a need for direct supervision, however, to be effective, it must be based on efficiency and not power. In order for this to happen in the construction industry, a number of things have to happen. First, everyone is a worker. Second, those chosen to supervise the work of others do so in addition to performing their own activities. They do not stop performing the activity they were trained to do and strictly manage. I always found it strange that, just as I mastered the art of drawing construction documents, I stopped drawing and managed others who had not yet mastered the art. Third, there must be consensus as to the person(s) most qualified to supervise and if there are many, they should rotate. Fourth, workers who supervise should not receive more compensation. Compensation should be made on the performance of the individual and the team as a whole. If direct supervision was based on efficiency rather than power, as outlined above, eventually, workers would be in a position of managing themselves.

## **5.4 COORDINATION SKILLS**

The education and training of actors in the construction industry promotes competitive behavior for two reasons. First, emphasis is placed on individual achievement and being competitive. Second, there is no interaction between students of different disciplines in the construction industry.

Educational institutions teach competitive behavior. From the very beginning, students compete with one another for good grades. When institutions do teach students cooperation, it is usually the incorrect meaning of cooperation. Students are warned not to cheat while testing and told, "If you do not cooperate, you will be sent to the principles office". Cooperation does not mean to "do what your told", obedience [Kohn 92]. The correct definition of cooperation is "to work or act with another or other persons willingly and agreeably." [Stein 71]. So, in actuality, if the student were to cooperate, each and every one of them would be cheating. The real meaning of cooperation should

be taught to students and emphasis should be placed on their "working together" rather than against each other.

Simply forcing students to work in teams does not promote cooperative behavior because they continue to be evaluated on the same competitive criteria and are not given the skills to coordinate. According to Johnson and Johnson, there are five elements of cooperative learning: 1) positive interdependence, 2) face-to-face promotive interaction, 3) individual accountability, 4) social skills, and 5) group feedback [Johnson 92]. "The future of the world depends on the constructive and competent management of interdependence. Students who have had 12 to 20 years of cooperative learning will be in better able to do so than will students who have had 12 to 20 years of competitive and individualistic learning." [Johnson 92]

Students of architecture are taught self expression in school. Engineers are rational problem solving. Trades people are taught a trade. There is little interaction between these students while they are being educated and little attention is paid towards giving these students the coordination skills that they will need while working in the industry. Architects become disillusioned when they come out of school and find out that there is little room for self expression. Engineers go through the same thing when they find out that they can't just go off in their corner and solve the problem. Trades people feel threatened by designers. These things all happen because their training focuses strictly on performing a task in isolation. There is no isolation in the construction industry because it is coordination intensive.

Internship and apprenticeship are perhaps better ways to educate actors for the construction industry. This way, they are given more of a realistic view of the trade or profession and they can begin to pick up the coordination skills that are needed. The problem with practicing professionals and tradesmen acting as mentors is that stereotypes are passed on from generation to generation. This makes it very difficult to get rid of stereotypes, which promote competitive behavior. One way to encourage interaction between different disciplines during the education process would be to rotate students between programs and to take on many mentors. Being exposed to many stereotypes, rather than just one, would minimize their effect. Eventually, they would disappear as cooperation became more prevalent.

## **Chapter Six: Conclusions**

Jay Galbraith's "Contingency Theory" states that there is no one best way to organize and any way of organizing is not equally effective. The same is true for the delivery of a building. There is no one best way to deliver a building and any method of delivery is not equally effective. The most efficient delivery method for any given building depends on the degree of goal congruence between actors, the type of governance needed between them, and the amount of coordination needed.

Goal congruence is the degree to which different actors share the same goals. Governance is the control that is needed to maintain each actor's goals. More control is needed when goal congruence is low than when it is high. There are three different types of governance which can be used in the delivery of a building: bureaucratic, market, and cooperative. Bureaucratic provides the greatest amount of control. Market and cooperative governance provide moderate and the least amount of control, respectively. Therefore, bureaucratic governance is most suitable when goal congruence is low and cooperative governance is most suitable when goal congruence is high. Market governance is suitable anywhere between these two extremes.

Governance can either facilitate or impede coordination depending on which type of governance is chosen. The reason for this is that the effectiveness of the mechanisms which are used to facilitate coordination are dependent on the type of governance used. The ten coordination mechanisms analyzed within this thesis are listed in figure 4. There are five vertical (V) coordination mechanisms and five lateral (L) coordination mechanism. The effectiveness of each varies depending on which type of governance is used. The following conclusions can be drawn from figure 4:

- All mechanisms are effective under cooperative governance.
- Only two lateral mechanisms are effective under market governance.
- All vertical mechanisms, with the exception of Marketing, are effective under bureaucratic governance.
- There is no mechanism which is effective under all three types of governance.

If we assume that the availability of many coordination mechanisms is better than a few, then coordination is facilitated by cooperative governance and impeded by both market and bureaucratic governance.

The difficulty in the construction industry is that there is usually a low degree of goal congruence between actors and a large amount of coordination required. Market or

GOVERNANCE	COOPERATIVE	MARKET	BUREAUCRACY	
	X	X		1. Coordinators (L)
	X		X	2. Coordination Stamp (V)
	X			3. Information Technology (L)
	X		X	4. Standards (V)
	X		X	5. Quality Control (V)
	X		X	6. Direct Supervision (V)
	X			7. Marketing (V)
	X			8. Conventions (L)
	X	X		9. Committees (L)
	X			10. Flexible Workforce (L)

(L) = Lateral  
(V) = Vertical

**MECHANISMS**

*figure 4. Effectiveness of Coordination Mechanisms*

bureaucratic governance would be chosen based on the amount of goal congruence and cooperative governance would be selected based on the amount of coordination that is needed. The selection of one or the other would not lead to the most efficient delivery of a building. In order to deliver buildings more efficiently in the future, we must either find a way to increase goal congruence between actors or reduce the coordination that is needed for any given building.

The ways to increase goal congruence are discussed in chapter five. Goal congruence can be increased by changing the payoff to the actors, changing the focus of

the goals, changing contracting methods, changing the methods used to select actors, extend a project's duration, and eliminate status hierarchies. There are two ways to decrease the coordination needed, as described in chapter two. One way is to reduce the amount of coordination that takes place by changing the actual building. The other way is to increase the actors' ability to coordinate. The interesting thing is that in order to increase an actor's ability to coordinate, coordination mechanisms are needed to facilitate coordination, which requires a high degree of goal congruence. There is only one way to deliver buildings more efficiently and that is to increase goal congruence by using cooperative governance.

## **6.1 TOPICS FOR FUTURE RESEARCH**

This thesis made no attempt to measure the effectiveness of each of the coordination mechanisms studied. In the conclusions, an assumption was made concerning the effectiveness of using many mechanisms as opposed to just a few. Further research into the effectiveness of each mechanism would allow us to determine whether it is, in fact, more efficient to use many mechanisms as opposed to using one mechanism, well.

If we believe Robert Axelrod and his notion that it is only a matter of time before most, and quite possibly all, organizations are governed by cooperation, will it be easier for organizations to convert from a bureaucratic or market governance, or, would it be easier to build a cooperative organization from scratch?

## **References**

- Axelrod, R. [1984] *The Evolution of Cooperation*. Basic Books, a division of HarperCollins.
- Dertouzos, M. L., Lester, R. K., and Solow, R. M. [1989] *Made in America: Regaining the Productive Edge*. Cambridge: MIT Press.
- DeVenne, P.B. et al. [1982] *The American Heritage Dictionary*. Boston: Houghton Mifflin Company.
- Eccles, R. G. [1981] "The Quasifirm in the Construction Industry". Journal of Economic Behavior and Organization. Vol. 2: pp. 335-357.
- Fisher, T. [1994] "Our Perfect Competition". Progressive Architecture. November: p. 9.
- Galbraith, J. R. [1973] *Designing Complex Organizations*. Reading, MA: Addison-Wesley.
- Galbraith, J.R. [1994] *Competing with Flexible Organizations*. Second Edition. Reading, MA: Addison-Wesley.
- Gutman, R. [1988] *Architectural Practice: A Critical View*. New York: Princeton Architectural Press.
- Hamel, G., Doz, Y. L. and Prahalad, C. K. [1989] "Collaborate with Your Competitors--and Win", Harvard Business Review. January-February, pp. 133-139.
- Handy, C. [1994] *The Age of Paradox*. Boston: Harvard Business School Press.
- Howard, H. C., Levitt, R. E., Paulson, B. C., Pohl, J. G. and Tatum, C. B. [1989] "Computer Integration: Reducing Fragmentation in AEC Industry". Journal of Computing in Civil Engineering. Vol. 3, No. 1, January: pp. 18-32.
- Johnson, D.W. and Johnson, R.T. [1992] "Preparing Children To Live in an Independent World", *Cooperation: Beyond the Age of Competition*. Philadelphia: Gordon and Breach.
- Kohn, A. [1992] "Cooperation: What it means and doesn't mean", *Cooperation: Beyond the Age of Competition*. Philadelphia: Gordon and Breach.
- Krol, E. [1992] *The Whole Internet User's Guide & Catalogue*. Sebastopol, CA: O'Reilly & Associates, Inc.
- Malone, T. W. and Crowston, K [1991] "Toward an Interdisciplinary Theory of Coordination", MIT Center for Coordination Science Technical Report No. 120.
- Mintzberg, H. [1979] *The Structuring of Organizations*. Englewood Cliffs, NJ: Prentice-Hall.

- Mollner, T. [1992] "Business, The Relationship Age, and a New Kind of Nation", *Cooperation: Beyond the Age of Competition*. Philadelphia: Gordon and Breach.
- Ouchi, W.G. [1980] "Markets, Bureaucracies, and Clans". Administrative Science Quarterly. March: pp. 129-141.
- Peters, T. [1992] *Liberation Management: Necessary Disorganization for the Nanosecond Nineties*. New York: Fawcett Columbine.
- Salazar, G.F., Serrambana, Jr., V.M., Denney, Jr., T.J. and Farrell, T. [1993] "The Cost-Trust Relationship in the Construction Industry", A report to the Construction Industry Institute and the University of Texas at Austin from Worcester Polytechnic Institute, Worcester, MA.
- Stein, J. [1971] *The Random House Dictionary of the English Language*. New York: Random House.
- Witness [1993] *Jehovah's Witnesses: Proclaimers of God's Kingdom*. Brooklyn: Watchtower Bible and Tract Society of New York, Inc..